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Wednesday, February 08, 2006

Time, sacrifice, and value

Here is a modified excerpt from A Measure of Sacrifice:

Mechanical clocks, bell towers, and sandglasses, a combination invented in 13th century Italy, provided the world's first fair and fungible measure of sacrifice. So many of the things we sacrifice for are not fungible, but we can arrange our affairs around the measurement of the sacrifice rather than its results. Merchants and workers alike used the new precision of clock time to prove, brag, and complain about their sacrifices.

In a letter from a fourteenth-century Italian merchant to his wife, Francesco di Marco Ganti invokes the new hours tell her of the sacrifices he is making: "tonight, in the twenty-third hour, I was called to the college," and, "I don't have any time, it is the twenty-first hour and I have had nothing to eat or drink." [4] Like many cell phone callers today, he wants to reassure her that he is spending the evening working, not wenching.

A major application of clocks was to schedule meeting times. Being a city official was an expected sacrifice as well as a source of political power. To measure the sacrifice, as well as to coordinate more tightly meeting times, the modern clocks of the fourteenth century came in handy. Some regulations of civic meetings of this period point up that that measuring the sacrifice was important, regardless of the variable output of the meetings. In Nuremburg, the Commission of Five "had to observe the sworn minimum meeting time of four "or" (hours) per day, regardless of whether or not they had a corresponding workload. They were also obliged to supervise their own compliance by means of a sandglass.[4]

As commerce grew, more quantities needed their value to be measured, leading to more complications and more opportunities for fraud. Measurement disputes become too frequent when measuring too many quantities.

Measuring something that actually indicates value is difficult. Measuring something that indicates value and immune to spoofing is very difficult. Labor markets did not come easily but are the result of a long evolution in how we measure value.

Most workers in the modern economy earn money based on a time rate -- the hour, the day, the week, or the month. In

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agricultural societies slavery, serfdom, and piece rates were more common than time-rate wages. Time measures input rather than output. Our most common economic relationship, employment, arranges our affairs around the measurement of the sacrifice rather than its results.

To create anything of value requires some sacrifice. To successfully contract we must measure value. Since we can't, absent a perfect exchange market, directly measure the economic value of something, we may be able to estimate it indirectly by measuring something else. This something else anchors the performance – it gives the performer an incentive to optimize the measured value. Which measures are the most appropriate anchors of performance? Starting in Europe by the 13th century, that measure was increasingly a measure of the sacrifice needed to create the desired economic value.

Actual opportunity costs are very hard to measure, but at least for labor we have a good proxy measure[14] of the opportunities lost by working -- time. This is why paying somebody per hour (or per month while noticing how often a worker is around the office) is so very common. It's far cheapr to measure time, thus estimating the worker's opportunity costs, than actual value of output.

Time as a proxy measure for worker value is hardly automatic – labor is not value. A bad artist can spend years doodling, or a worker can dig a hole where nobody wants a hole. Arbitrary amounts of time could be spent on activities that do not have value for anybody except, perhaps, the worker himself. To improve the productivity of the time rate contract required two breakthroughs: the first, creating the conditions under which sacrifice is a better estimate of value than piece rate or other measurement alternatives, and second, the ability to measure, with accuracy and integrity, the sacrifice.

Three of the main alternatives to time-rate wages are eliminating worker choice (i.e., serfdom and slavery), commodity market exchange, and piece rates. When eliminating choice, masters and lords imposed high exit costs, often in the form of severe punishments for escape, shirking, or embezzlement. Serfs were usually required to produce a particular quantity of a good (where the good can be measured, as it often can in agriculture) to be expropriated by the lord or master. Serfs kept for their personal use (not for legal trade) either a percentage or the marginal output, i.e. the output above and beyond what they owed, by custom or coercion, to their lord.

Where quantity was not a good measure of value, close observation and control were kept over the laborer, and the main motivator was harsh punishments for failure. High exit costs also provided the lord with a longer-term relationship, thus over time the serf or slave might develop a strong reputation for trustworthiness with the lord. The undesirability of servitude, from the point of view of the

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laborer at least, is obvious. Serfs and slaves faced brutal work conditions, floggings, starvation, very short life spans, and the inability to escape no matter how bad conditions got.

Piece rates measure directly some attribute of a good or service that is important to its value – its quantity, weight, volume, or the like -- and then fix a price for it. Guild regulations which fixed prices often amounted to creating piece rates. Piece rates seem the ideal alternative for liberating workers, but they suffer for two reasons. First, the outputs of labor depend not only on effort, skills, etc. (things under control of the employee), but things out of control of the employee. The employee wants something like insurance against these vagaries of the work environment. The employer, who has more wealth and knowledge of market conditions, takes on these risks in exchange for profit.

In an unregulated commodity market, buyers can reject or negotiate downwards the price of poor quality goods. Sellers can negotiate upwards or decline to sell. With piece rate contracts, on the other hand, there is a fixed payment for a unit of output. Thus second main drawback to piece rates is that they motivate the worker to put out more quantity at the expense of quality. This can be devastating. The tendency of communist countries to pay piece rates, rather than hourly rates, is one reason that, while the Soviet bloc's quantity (and thus the most straightforward measurements of economic growth) was able to keep up with the West, quality did not (thus the contrast, for example, between the notoriously ugly and unreliable Trabant of East Germany and the BMWs, Mercedes, Audi and Volkswagens of West Germany).

Thus with the time-rate wage the employee is insured against vagaries of production beyond his control, including selling price fluctuations (in the case of a market exchange), or variation in the price or availability of factors of production (in the case of both market exchange or piece rates). The employer takes on these risks, while at the same time through promotion, raises, demotions, wage cuts or firing retaining incentives for quality employee output.

Besides lacking implicit insurance for the employee, another limit to market purchase of each worker's output is that it can be made prohibitively costly by relationship-specific investments. These investments occur when workers engage in interdependent production -- as the workers learn the equipment or adapt to each other. Relationship-specific investments can also occur between firms, for example building a cannon foundry next to an iron mine. These investments, when combine with the inability to write long-term contracts that account for all eventualities, motivate firms to integrate. Dealing with unspecified eventualities then becomes the right of the single owner. This incentive to integrate is opposed by the diseconomies of scale in a bureaucracy, caused by the distribution of knowledge, which market exchange handles much better [13]. An in-depth discussion of economic tradeoffs that produce observed distributions of firm sizes in a market, i.e. the number of workers involved in an employment relationship instead of selling their wares directly or working for smaller firms, has been discussed in [11,12]

The main alternative to market exchange of output, piece rate, or coerced labor (serfdom or slavery) consists of the employers paying by sacrifice -- by some measure of the desirable things the employee foregoes to pursue the employer's objectives. An hour spent at work is an hour not spent partying, playing with the children, etc. For labor, this "opportunity cost" is most easily denominated in time – a day spent working for the employer is a day not spent doing things the employee would, if not for the pay, desire to do. [1,9]

Time doesn't specify costs such as effort and danger. These have to be taken into account by an employee or his union when evaluating a job offer. Worker choice, through the ability to switch jobs at much lower costs than with serfdom, allows this crucial quality control to occur.

It's usually hard to specify customer preferences, or quality, in a production contract. It's easy to specify sacrifice, if we can measure it. Time is immediately observed; quality is eventually observed. With employment via a time-wage, the costly giving up of other opportunities, measured in time, can be directly motivated (via daily or hourly wages), while quality is motivated in a delayed, discontinuous manner (by firing if employers and/or peers judge that quality of the work is too often bad). Third parties, say the guy who owned the shop across the street, could observe the workers arriving and leaving, and tell when they did so by the time. Common

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synchronization greatly reduced the opportunities for fraud involving that most basic contractual promise, the promise of time.

Once pay for time is in place, the basic incentives are in place – the employee is, verifiably, on the job for a specific portion of the day – so he might as well work. He might as well do the work, both quantity and quality, that the employer requires. With incentives more closely aligned by the calendar and the city bells measuring the opportunity costs of employment, to be compensated by the employer, the employer can focus observations on verifying the specific quantity and qualities desired, and the employee (to gain raises and avoid getting fired) focuses on satisfying them. So with the time-wage contract, perfected by northern and western Europeans in the late Middle Ages, we have two levels of the protocol in this relationship: (1) the employee trades away other opportunities to commit his time to the employer – this time is measured and compensated, (2) the employer is motivated, by (positively) opportunities for promotions and wage rate hikes and (negatively) by the threat of firing, to use that time, otherwise worthless to both employer and employee, to achieve the quantity and/or quality goals desired by the employer.[1]

References:

[1] A good discussion of time-wage vs. piece-rate vs. other kinds of employment contracts can be found in McMillan, Games, Strategies, and Managers, Oxford University Press 1992

[4] My main source for clocks and their impact is Dohrn-van Rossum, History of the Hour – Clocks and Modern Temporal Orders, University of Chicago Press, 1996.

[9] The original sources for much of the time rate contract discussion is Seiler, Eric (1984) “Piece rate vs. Time Rate: The Effect of Incentives on Earnings”, Review of Economics and Statistics 66: 363-76 and Ehrenberg, Ronald G., editor (1990) “Do Compensation Policies Matter?”, Special Issue of Indsturial and Labor Relations Review 43: 3-S-273-S

[11] Coase, R.H., The Firm, the Market and the Law, University of Chicago Press 1988

[12] Williamson, Oliver, The Economic Institutions of Capitalism, Free Press 1985

[13] Hayek, Friedrich, "The Use of Knowledge In Society"

[14] The insight that we measure value via proxy measures is due to Yoram Barzel.

Posted by Nick Szabo at 1:10 PM

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